

The general conclusions are that,

(1.) Both the deflectable and undeflectable rays give relative conductivities nearly, but certainly not quite, equal to the relative densities.

(2.) All the different kinds of undeflectable rays give the same relative conductivities, but the deflectable rays give somewhat different relative conductivities.

Both these kinds of rays are in this respect sharply distinguished from Röntgen rays, which give relative conductivities several times greater than the relative densities in the case of gases containing sulphur or the halogens.

“Some Physical Properties of Nitric Acid Solutions.” By V. H. VILEY, F.R.S., and J. J. MANLEY, Daubeny Curator, Magdalen College, Oxford. Received February 11,—Read March 7, 1901.

(Abstract.)

The results obtained by the authors on the electric conductivity of solutions of nitric acid have led them to continue their investigations on other physical properties of the same substance with a view of confirming the conclusions drawn therefrom.

In the present paper the properties examined are the densities, with especial reference to the contractions, and the refractive indices.

The various sources of error and their possible magnitude are discussed in full: for the densities, those of analysis, unavoidable in this case, temperature, errors of filling pyknometers both with acid and water; for the refractive indices, those of micrometer screws, divided circle, parallelism of quartz plates are more especially alluded to, as also the several effects likely to be produced by the various substances with which the acid solutions of necessity came into contact. The results obtained by both methods are given in a series of tables, and compared with those calculated from various equations for straight lines. These show that the physical properties are discontinuous at points corresponding very approximately to the concentrations required for simple molecular combinations *only* of nitric acid and water. In the case of the densities and contractions, the best defined points of discontinuity correspond to the composition of the hydrates with 14, 7, 4, 3, 1·5, and 1 molecular proportions of water; in the case of the refractive indices, the most marked points correspond to the 14, 7, and 1·5 hydrates.

The results for the contractions further confirm those for the electric conductivities as to a remarkable discontinuity at concentrations 95 per

cent. to 100 per cent., which can possibly be explained by some cause other than the combination of acid with water.

The contractions show that these points of discontinuity, though to some degree real, yet to another degree are ideal in that there is within the limits of 1 to 2 per cent. in the vicinity of such points a transition stage.

The values for μ are further expressed in terms both of Gladstone and Dale's, and of Lorentz' formula, and it is shown that the values in neither case are constant, but decrease with increase of concentration, and also that Pulfrich's formula which expresses the relation between the refractive index and the contraction in terms of a constant is only approximately applicable for results differing by small percentage concentrations, but not so in the case of considerable differences.

The results are illustrated by a selection of curves, with especial reference to the points of discontinuity.

'The Anatomy of Symmetrical Double Monstrosities in the Trout.' By JAMES F. GEMMILL, M.A., M.D., Lecturer in Embryology and University Assistant in Anatomy, University of Glasgow. Communicated by Professor CLELAND, F.R.S. Received February 6,—Read March 7, 1901.

(Abstract.)

This paper contains the results of an investigation into the anatomy of a series of trout embryos exhibiting different degrees of symmetrical duplicity, and gives an account of the structural details which attend the fusion, disappearance, or special adaptation of parts in the region of transition from the double to the single condition. Some general questions suggested by these results are also discussed.

The monstrosities examined were four months old counting from the time of fertilisation, and they form a fairly complete series ranging from specimens in which the duplicity does not affect more than the anterior part of the head to specimens in which there is union by the posterior part of the body or by the yolk-sac only. The classification adopted has special reference to the material at my disposal and is on the same general lines as that given by Professor Windle in the 'Proceedings of the Zoological Society,' 1895.

The examination of the monstrosities was necessarily preceded by an investigation into the anatomy of normal trout embryos at corresponding stages in development. The results of this investigation are briefly given, special attention being paid to the cranial, visceral and vertebral skeleton, which at this period is wholly cartilaginous.